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## GENERAL NOTES.

### BOTANY.[1]

NOTES ON MISTLETOES.—In a meeting of the Academy of Natural Sciences of Philadelphia, in October, 1881, Thomas Meehan, in commenting on specimens of *Phoradendron juniperum* var. *libocedri* Engelm. and *Arceuthobium occidentale* var. *abietinum* Engelm., from Nevada, noted a few facts in relation to mistletoes, which are of such interest that we transcribe them verbatim. Mr. Meehan said:

"The mistletoe of the Eastern States had a general resemblance to that of Europe, *Viscum album;* but the old genus Vis-

[1] Edited by PROF. C. E. BESSEY, Ames, Iowa.

cum had been divided by modern botanists, although the lines of distinction were somewhat artificial. We had two genera, Phoradendron and Arceuthobium. Among the leading distinctions might be mentioned that the European branch of the family Viscum, as now restricted, had the anther open by three pores or slits, our Phoradendron by two, while the Arceuthobium had but one. There were other slight differences in pollen grains, cotyledons and form of the fruits. The European mistletoe is usually found on deciduous trees only, an instance being recorded where it had been found on the Scotch pine in Germany, and its American representative, *Phoradendron flavescens* Nuttall, seemed also confined to deciduous trees and shrubs.[1] This extends across the continent, a form being found on the Pacific coast, still confined to deciduous plants; while another genus, Arceuthobium, seems wholly confined to the coniferous trees which are mixed with the deciduous ones. The name Arceuthobium is suggestive of this fact, it being derived from two Greek words signifying "living on the juniper," Phoradendron, on the other hand, meaning simply "living on, or stealing from trees." Arceuthobium, however, did not live wholly on junipers. In the herbarium of the academy was a specimen of *A. occidentale* growing on *Juniperus occidentalis*—these Nevada specimens were on *Pinus ponderosa.* The specimens of *Phoradendron juniperinum* were growing on *Libocedrus decurrens*, which, by the way, was, he believed, the first time this pretty cupressineous tree had been reported from the State of Nevada. Among the differences noted by Engelmann in the Botany of California between Phoradendron and Arceuthobium, was that while the former flowered in February and March, and matured its fruit 'next winter,' the fruit of the Californian species opened in the summer, and did not mature 'till the second autumn.' The European mistletoe was stated by Bentham to open in spring, and perhaps this was so; it was formerly supposed to be the case with the American *Phoradendron flavescens*, but Mr. Wm. Canby had shown to the academy recently, that in Delaware the flowers opened in the fall, and the fruit matured in the autumn of the following year, or just one year afterward. The flowers and fruit were on the trees at the same time together. If this were general with Phoradendron, it still lessened the distinctions between the genera. Usually Phoradendron bore leaves, while Arceuthobium was leafless—but the Libocedrus parasite was as destitute of leaves as an Arceuthobium, and the common observer would see little in their general aspects to distinguish them. But there was one great difference in the genus, at least as represented by these two species. In opening the box which contained the specimens, the whole mass was covered with a dense viscid secretion, which rendered it very difficult to separate one branch from another. On leaving the lid open a little while, the watery particles soon evaporated, leaving a dry gummy deposit over the whole surface. While this was going on, the seeds were ejected with great force from their endocarps, being projected against the face with such force as to leave a stinging sensation. Dr. Engelmann has noted this power of ejection in the berries of this plant. The Phoradendron exhibited no trace of any such power, though there seemed to be little difference in the structure of the berries. The facts raised a nice teleological question. Birds did not seem to use the berries. As they were so viscid that the famous bird-lime is made from some species, it is probable the very viscidity would prevent the free use of the beak in any attempt to use the seeds. But it was believed that by becoming attached to the feet or feathers of birds, the seeds were widely distributed, and that in this way the plant had all the advantage necessary for distribution in the 'struggle for life.' But Arceuthobium, besides all the advantages to be derived from this mode of distribution, had an additional aid from a projecting force.

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[1] Mr. Jos. James believes he saw a specimen some years ago on *Abies Canadensis.*

"Did Arceuthobium at one time exist when or where there were no birds, and had it to depend on projection alone for its distributing power, and is the viscidity a later development? Did Phoradendron once possess the power, and has it abandoned it from having through the ages found out that it travels well enough without its exercise? Or is it rather, as the speaker himself inclined to believe, that nature loved to aim expressly at variety, and was continually exhibiting her power to accomplish the same end by a wonderful variety of means? But whatever might be thought of the various theories of development, and the laws of final causes which may have operated to produce changes, there could be but little doubt but parasitism was an acquired habit, and the endeavor to find out what these plants were, and how they behaved before they were parasites, was fast becoming one of the most interesting of biological studies.

"The seeds ejected from the endocarp in Arceuthobium fastened themselves to the branches of trees by a glutinous mass at one end. This end was opposite to the radicle, which, in germinating, would have to push out from above, and curve downwards towards the branch in order to attach itself. He had not seen them during the process of germination, but as the testaceous covering was held fast by the glutinous secretion, it is probable the cotyledons would be drawn out as the plumule took its upright position, leaving the testa as an empty case fastened to the branch. Presuming that this must be the case with other Loranthaceous plants, it was difficult to understand the process by which the East Indian species performed the locomotive feat recently noted by Dr. Watt, and which from its remarkable nature has had a wide publication. It was reported as the observation of Dr. Watt that a seed falling on and becoming attached to the coriaceous leaf of a Memecylon, would send out its radicle, which, curving down, formed a flattened disk by which it attached itself to the leaf. But, as if it knew that a leaf could not permanently support a perennial plant, the cotyledons were lifted and turned to the other side, when the end with the disk moved to another place, and in this way, the seed traveled to a more favorable spot. Without reflecting on the observation, Mr. Meehan believed it should be repeated in order to be sure of no mistake. In all plants in our country which fastened to an object through a disk at the end of a rootlet or tendril, as in Ampelopsis and *Bignonia capreolata*, the attachment was made while the disk was forming. A disk once formed, did not reattach itself to an object when removed from the original spot. In like manner the cotyledons, once removed from the endocarps, would have no viscidity with which to form a resisting power while the disk was unfastening itself from its undesirable location. There was, however, so much of singular behavior in the mistletoe family that further observations were very desirable."—*Proc. Acad. Nat. Sci. Phila.*

DIFFERENCES IN RADIAL THICKNESS IN TREE TRUNKS.—Dr. Stearns in a recent paper read before the Am. Forestry Association, calls attention to certain differences in the diameters of tree trunks which are well worthy of more extended observation. He asks "whether the greatest diameter is persistently incidental to a certain aspect or quarter of the compass." Professor Whitney found the greatest diameter of the giant trees of California, (*Sequoia gigantea*) to be twenty four feet, one and one half inches; this was in a north and south direction. The least diameter was twenty three feet, in an east and west direction.

Furthermore, a remarkable difference was observed in the lengths of the several radii. The radial length from the heart of the tree to the circumference at its south point was thirteen feet, nine and one half inches (13 ft. 9½ in.), while the corresponding measurement north of the heart was but ten feet, four inches (10 ft. 4 in.). The radii making up the east and west diameter were of equal length, that is, eleven feet, six inches (11 ft. 6 in.).

Dr. Stearns suggests that the excess of growth of the south half of the trunk may be due to the greater heat and light which it received. The climate of the site of the tree under consideration, the Calaveras grove, is cool, hence the greater heat of the side exposed to the sun was advantageous to it. "In a comparatively arid region, with a high temperature and infrequent rainfall and a dry atmosphere, we may suppose that the southerly half of a tree might, through excess of light and heat, suffer from dessicating influences, and make a less growth than the northerly half, as the latter would have the advantage, if advantage it be, in such a climate, of less light and heat and more shade; while in a region less arid, with a much lower mean temperature, etc., the greater proportion of light and heat which the southerly half receives, would give that side of the tree an advantage over the northerly half." In corroboration of this hypothetical explanation of Dr. Stearns, we may record the statement of Professor Budd, of Iowa, that in trees grown upon the prairies the thickness of wood is always greater upon the north side of the trunk than upon the south side. We shall be glad to hear from our correspondents upon this point.

A CLIMBING POLYPODIUM has been detected by that excellent botanical collector, A. H. Curtiss, on Key Largo. The species is probably *Polypodium Swartzii* Baker, and its discovery is a most interesting one, giving another fern to Florida, and carrying our list of North American ferns up to 156.

Subscribers for Mr. Curtiss' plants will be glad to know that he has not only collected enough of the new fern to supply all of his sets, but that he has also collected fine specimens of *Asplenium serratum* as well.

Soon after an Ophioglossum, which proves to be *O. nudicaule* L. fil., collected by Dr. Parry, came to hand from California, adding another species to the flora of that State.—*G. E. Davenport.*

## ZOÖLOGY.

THE OCCURRENCE OF MEPHITIS INTERRUPTA RAFINESQUE IN NORTH CAROLINA. — During the past summer I spent several weeks in the neighborhood of Roan mountain, N. C., an interesting region to any one having a taste for natural history matters. Here I found the *Pitys bryanti* Harper, the *Margaritana ravenelliana* Lea, the rare new Helices recently described by Mr. Binney, and last, but not least, here I killed and skinned a fine specimen of the rare *Mephitis interrupta* Rafinesque.

The synonymy of this species is fully set forth in Dr. Coues' Fur-bearing animals, which he heads *Mephitis* (*Spilogale*) *putorius* (L.).

Speaking of Rafinesque's claims to the species he says: "The *Mephitis interrupta* of Rafinesque may or may not have been "a pure figment of his imagination." It probably, however, had some basis, and even if his account does not wholly agree with specimens of *Spilogale putorius* examined, it will be remembered that even his elastic imagination would be put to the stretch to describe a spotted and striped skunk in terms too exaggerated to be met by the reality which this species offers. We may accept his name as undoubtedly belonging here, and in fact we should adopt it, as a more definite appellation than Zorilla, were it not anticipated by Linnæus as just shown."

Dr. Coues, in a recent letter to me, says, "the species undoubtedly belongs to Rafinesque."